Schedule 2

Data Centre Platform and Network Management Services

to

Request for Proposal
for the
Provision of IT Infrastructure Operations
and Managed Workplace Services
[UNHCR RFP/2018/1068]
(the “RFP”)

effective _____ 2018

between

The Office of the United
Nations High Commissioner
for Refugees

and Contractor

Table of Contents

1 INTRODUCTION 3
2 SERVICES 3
3 PLATFORM MANAGEMENT SERVICES 8
4 NETWORK MANAGEMENT SERVICES 16
5 IMPLEMENTATION OF NEW SERVICES 20
6 MAINTENANCE WINDOWS 21
7 OUT OF SCOPE SERVICES 22

1 Introduction

1.1. This Schedule 2 sets forth Contractor's roles and responsibilities in providing data centre support and maintenance services including the provision of support and administration services for all server hardware, operating systems, and other software products related to all servers located in the Data Centres.

1.2. Unless the context otherwise requires, capitalized terms used but not defined in this Schedule 2 shall have the meaning given to them in Schedule 1 (Technical Definitions) or the Agreement.

1.3. For purposes of this Schedule 2, the following terms shall have the following meanings:

(a) "Data Centres" shall mean:

(i) Centralized data centre (currently SafeHost);

(ii) Headquarters Core Infrastructure in Geneva and Budapest;

(iii) UN International Computing Centre (UNICC);

(iv) Amazon Cloud Services;

(v) Microsoft Cloud Services;

(vi) disaster recovery sites; and

(vii) other centralized computing sites as designated by UNHCR.

2 Services

2.1. General

Data Centre and Network Management Services are the services and activities required to support the UNHCR current and future centralized and computing systems environments (e.g., development, testing, staging, production), and all of the supporting infrastructure and security required to deliver the Services and meet Service Level Requirements (SLRs).

The Contractor-supported Services environments include Microsoft Windows Server (and associated services), Hyper-V private cloud infrastructure, Linux-based systems, middleware, physical and virtual servers utilizing internal and external data storage devices, and backup and recovery services. The Contractor-supported Network Services for the data centre includes management of the Cisco network infrastructure, all virtual networking, storage-area networking, and all supporting Software.

As a growing number of UNHCR systems are already hosted on Microsoft and Amazon cloud services, the contractor will also manage the respective tenant and administrator portals of Microsoft O365, Microsoft Azure, Amazon Web Services, and any other related portal providing operational control to the services in scope.

The following are the key high-level Service objectives the UNHCR expects to achieve through outsourced Data Centre and Network Managed Services:

- Meet UNHCR business needs for reliable and secure Services that meet SLRs;
- Acquire Services that leverage best practices and achieve market price performance;

- Provide automated reporting mechanisms to ensure performance meets requirements;
- Provide seamless operational support for production and Disaster Recovery; and
- Provide support for the UNHCR migration of applications and services to the Cloud.

Contractor shall provide the personnel, skills and controls to efficiently and effectively support the UNHCR business applications and infrastructure inclusive of all network infrastructure, server hardware, storage devices, virtual machines, operating systems, tools, and other software products related to all servers in scope in the Data Centres, including documentation by following ITIL Service Management processes and as per guidelines and policies as defined or agreed by UNHCR. The sub-services, as more fully described within, include:

Platform Scope	Data Center
Platform	
Data Center Windows and Linux Servers	Included
Cloud Windows and Linux Servers	Included
Hypervisor Hosts	Included
Storage	
DASD (MDS)	Included
Tape Library	Included
SAN Storage (3PAR, NetApp)	Included
Platform Managed Services	
Platform support and maintenance	Included
Cloud tenant portal management and support	Included
Systems and storage monitoring	Included
Systems and storage event management	Included
System hardware management and support	Included
System software management and support	Included
Storage management and capacity planning	Included
Backup and recovery services	Included
Platform reporting	Included
Server and storage documentation	Included

Network Scope	Data Center	HQ LANs
Network Device Configuration, Maintenance and Support		
High-End Edge Devices (3921/2921 ISR Routers, ASA/CheckPoint Firewalls)	Included	Included
Low-End Edge Devices (1921 ISR, Meraki, etc.)	Included	Included

Network Scope	Data Center	HQ LANs
Load Balancers (KEMPs)	Included	N/A
Core Switches	Included	Included
Distribution/Access Switches	Included	Included
IDS/IPS Devices	Included	Included
Wireless Access Controllers	N/A	Included
Wireless Access Points	N/A	Included
Traffic Shaping/Optimizing/Filtering Devices	Included	Included
Modems/Microwave Links	N/A	Included
Network Printers	N/A	Included
Network Management Services		
Network operations and administration	Included	Included
Level 2 local and remote network support, maintenance, troubleshooting and break-fix	Included	Included
Level 2 dispatch network support, maintenance, troubleshooting and break-fix	Included	Included
LAN Administration		
IP Addressing	Included	Included
DNS	Included	Included
DHCP	Included	Included
Wireless Network	Included	Included
VLAN Administration	Included	Included
Cable and Patch Management	Included	Included
Other		
Network Security	Included	Included
Device Installation/Deinstallation	Included	Included
Monitoring	Included	Included
Event Management	Included	Included
Reporting	Included	Included
Documentation	Included	Included
Asset Management	Included	Included
Change Management	Included	Included

2.2. Personnel

Providing trained and qualified personnel is essential to effective service delivery.

Contractor shall:

(a) Provide personnel with technical skills and competencies that allow for effective delivery of Services;

(b) identify one member of the Data Center and Network Management Services support team to act as the lead for all Platform related activities and another member to act as the lead for all Network/Telecoms related activities; these persons will be part of the Named Personnel as per Schedule 15 (Contractor Personnel Provisions);

(c) understand ITIL processes of Incident, Problem, Change, Release & deployment, and Asset & configuration management;

(d) be familiar with techniques of customer interaction and high standards of customer support;

(e) be familiar with UNHCR standard hardware devices;

(f) understand the UNHCR service level agreement and prioritization of Incidents and Service Requests;

(g) have been on-boarded with knowledge of the UNHCR business, mission, security awareness, and policies;

(h) HP Equipment

(i) For HP Data Center equipment, personnel are to possess relevant skills and certifications to manage HP Enterprise Data Center products, consisting primarily but not limited to HP Synergy or C7000 Blade Systems, and demonstrate all the necessary skills to install, configure, maintain, and decommission all hardware and firmware components.

(i) Windows Server Personnel

(i) for Level 1 Windows Server support, personnel are to possess a minimum of Microsoft Certified Solutions Associate (MCSA) certification in Windows Server 2012 or equivalent to demonstrate the skills necessary to administer Windows servers;

(ii) for Level 2 Windows Server support, personnel are to possess a minimum of Microsoft Certified Solutions Expert (MCSE) certification or equivalent, to demonstrate the skills necessary to operate an efficient data center, with expertise in identity management, systems management, virtualization, storage, and networking;

(iii) have team competencies in UNHCR server technologies, including but not limited to:

- Microsoft Windows Server 2008, 2012, 2016, and future released version of Microsoft Server editions;
- Microsoft Hyper-V;
- Microsoft System Center (SCCM, SCOM, etc.)
- Microsoft Active Directory Server and all related services (AD, CS, ADFS),
- Microsoft Cluster Service (MCS);
- Microsoft Data Protection Manager (DPM);

- Microsoft Domain Name Service (DNS);
- Microsoft Dynamic Host Configuration Protocol (DHCP);
- Microsoft File and Storage Services;
- Microsoft Internet Information Services (IIS) ;
- Microsoft Key Management Services (KMS);
- Microsoft FIM/MIM/EM+S;
- Microsoft Print Services;
- Microsoft Remote Access Service;
- Microsoft Remote Desktop Services (RDS) also known as Terminal Services (TS);
- Microsoft SharePoint;
- Microsoft Forefront Threat Management Gateway (TMG);
- Microsoft Windows Deployment Services (WDS); and
- Microsoft Windows Server Update Services (WSUS);

(iv) have team competencies in UNHCR desktop technologies, including but not limited to:

- Microsoft Office 365 suite;
- Microsoft Exchange On-line;
- SharePoint On-line;
- Skype for Business;
- OneDrive for Business; and
- Power BI.

(j) Linux Server and Appliance Personnel

(i) for Linux Server support, all personnel are to possess the training, skills, and experience necessary to configure, support, administer, operate. and troubleshoot a wide range of Linux operating systems, servers and appliances, including but not limited to:

- CentOS Linux;
- Debian/GNU Linux;
- RedHat Linux; and
- Ubuntu Linux.

(ii) have demonstrable, hands-on experience with Linux-based services, with team competencies in UNHCR technologies, including but not limited to:

- Domain Name Service (DNS);
- Open LDAP (Lightweight Directory Access Protocol);
- Socket Secure Proxy Software (SOCKS);
- Web Services (HTTP/HTTPS).

(k) Storage Personnel

(i) for NetApp storage support, all personnel managing UNHCR devices and data are to possess NetApp Certified Data Administrator (NCDA) certification to demonstrate skills in performing support, administrative functions, and performance management for NetApp data storage controllers running the ONTAP operating system in NFS and CIFS multiprotocol environments; have demonstrable knowledge and hands-on experience operating NetApp storage to manage and protect UNHCR mission-critical data.

(ii) for 3PAR support, all personnel must have demonstrable knowledge of 3PAR terminology and hands-on experience operating 3PAR storage tools and services to manage and protect UNHCR mission-critical data.

(iii) for all other direct attached storage solutions, all personnel must have demonstrable knowledge of solutions and technologies covering:

- RAID configurations and RAID controller management;
- Flash Memory or SSD Storage appliances or expansion cards;
- SAS, Fiber Channel, SATA connectivity;
- Microsoft Storage Spaces;
- Generic NAS solutions (e.g. FreeNAS); and
- CIFS, SMB, and NFS protocols.

(l) Network Personnel

(i) for Level 1 Network support, personnel are to possess Cisco Certified Network Administrator (CCNA) Routing and Switching certification or equivalent to demonstrate the skills necessary to administer devices on small or medium-sized networks; and

(ii) for Level 2 Network support, personnel are to possess Cisco Certified Network Professional (CCNP) Routing and Switching certification or equivalent to demonstrate the ability to plan, implement, verify, and troubleshoot local and wide-area enterprise networks and work collaboratively with specialists on advanced security, voice, wireless, and video solutions.

3 *Platform Management Services*

3.1. Platform Support and Maintenance

Platform Support and Maintenance are those activities associated with the provisioning and day-to-day management of the Data Centre environment, providing a stable server, storage, and supporting infrastructure; and effectively and efficiently performing procedures to ensure Services meet Service Level Requirements (SLRs) and requirements.

Contractor shall:

(a) Maintain a stable, live data centre environment in the Data Centres in order to achieve the Service Levels set forth in Schedule 10 (Service Level Requirements);

(b) provide support and maintenance for all infrastructure elements and systems contained within the Data Centres;

(c) perform routine administration and maintenance of UNHCR's Data Centre facilities, and to this effect shall:

(i) undertake corrective maintenance ensuring that all problems are raised and logged centrally;

(ii) ensure that all products and tools that support live operations comply with the defined technical standards, policies and procedures, and with Applicable Law;

(iii) pro-actively inform UNHCR if the operational environment in the Data Centre is unsuitable and action is required;

(iv) provide interface with relevant UNHCR teams to help ensure the fitness of the Data Centre accommodation and operational environment conditions;

(v) maintain and manage logs of all Data Centre system accesses;

(vi) maintain a record of inventory of on-site spares for critical equipment;

(vii) prepare and update standard operating procedures (SOPs); and

(viii) coordinate with Third Party vendors as needed to perform these activities.

3.2. Cloud Tenant Portal Management and Support

Cloud portals are the control point for managing UNHCR subscriptions, provisioning platform services, and monitoring performance of providers. With the steady migration and movement of platform services from UNHCR-owned assets and applications to the cloud, management of these resources is a core Contractor responsibility.

(a) Amazon Web Services:

(i) Manage the AWS Console on behalf of UNHCR;

(ii) provision and configure services;

(iii) monitor services;

(iv) perform ITIL processes as defined in Schedule 12 (Cross Functional and ITIL Services); and

(v) perform applicable managed services as defined in this Schedule 2.

(b) Microsoft Azure and Office 365:

(i) Manage the Azure and Office 365 tenant on behalf of UNHCR;

(ii) provision and configure services;

(iii) monitor services;

(iv) perform ITIL processes as defined in Schedule 12 (Cross Functional and ITIL Services); and

(v) perform applicable managed services as defined in this Schedule 2.

(c) UNICC:

(i) Liaise UNICC provisioning on behalf of UNHCR;

(ii) monitor services;

(iii) perform ITIL processes as defined in Schedule 12 (Cross Functional and ITIL Services); and

(iv) perform applicable managed services as defined in this Schedule 2.

3.3. Office 365 and EM+S portals

UNHCR sources Office 365 (O365) and Enterprise Mobility and Security (EM+S) services from Microsoft cloud services, covering Exchange Online, Skype for Business, EM+S, and other O365 services. Contractor shall:

(a) Resolve Incidents and Service Requests relating to all Office 365 and EM+S services;

(b) perform O365 configuration, covering Exchange Online and Skype for Business configuration and other O365 services;

(c) perform EM+S configuration;

(d) address operational aspects of Office 365 and EM+S services including availability, performance and stability;

(e) administer, use, and maintain the Office 365 and EM+S management interface which provides, but is not limited to the following:

(i) configuration tools allowing UNHCR to set policies, rules, security settings and routing requirements;

(ii) Exchange and Skype for Business activity trends, such as daily, weekly, monthly, and yearly volumes and patterns;

(iii) messages cleaned, deleted or rejected;

(iv) manage Azure AD, User, Mailbox, Site and Device permissions;

(v) real-time service statistics and availability data; and

(vi) Activity of corporate Azure AD and other UNHCR federated or linked Identity and Directory services.

(f) support ICT security event detection and filtering services, covering viruses, spam, malware, phishing, directory harvest, denial of service;

(g) support email message relay service for other UNHCR applications requiring SMTP service;

(h) support mobile device management provided through EM+S services in support of UNHCR's End-User-Devices; and

(i) monitor and manage disk quotas for individual and shared Office 365 accounts and mailboxes.

3.4. Active Directory Engineering Services

Designing, operating and maintaining Active Directory enables the delivery of services and access to UNHCR and its Authorized Users. In support of this effort, Contractor shall perform the following activities in accordance with the Active Directory functions set forth in Schedule 7 Appendix C (Active Directory RACI).

(a) Participate in Active Directory Service Strategy and Design activities;

(b) be responsible for Active Directory Service Transition activities;

(c) be responsible for Active Directory Service Operations activities;

(d) be responsible for Active Directory Data Management Operations; and

(e) be responsible for Application-specific Data Management Operations activities.

3.5. Active Directory Management Services

Contractor activities in support of Active Directory include but are not necessarily limited to:

(a) Perform Active Directory administration;

(b) control access to the UNHCR Active Directory domain;

(c) provide Active Directory support and troubleshooting;

(d) service Active Directory-related incidents and service requests;

(e) participate in Active Directory design;

(f) provide input to Active Directory requirements;

(g) implement UNHCR-approved changes to Active Directory;

(h) participate in projects that require Active Directory integration.

3.6. Systems and Storage Monitoring

Systems and Storage Monitoring means those functions associated with facilitating the proactive monitoring and Incident alerting for platform infrastructure and supporting UNHCR business applications and data, as well as the full management and administration of the management monitoring tools.

Contractor shall ensure that all system monitoring functions are periodically performed including:

(a) Maintain platform system management tools and proactively monitor the environment characteristics (e.g., availability, performance, incidents, issues and events) and identify, correlate, report and resolve Incidents and Problems according to prescribed SLRs;

(b) provide on-going, proactive, and scheduled console monitoring of Data Centre infrastructure, physical servers, virtual servers, appliances, and storage devices;

(c) configure alerts, thresholds, and monitoring for uptime and performance;

(d) respond to alerts and system messages, escalate and take corrective action as required;

(e) develop and maintain standard automated scripts to perform monitoring of UNHCR servers and storage;

(f) provide troubleshooting and escalation of Problems in the Data Centre computing environment;

(g) provide preventative measures, proactive monitoring, and system self-healing capabilities to limit outages that impact Services delivery;

(h) identify and report problems including system, file, storage, backup, and agreed critical resources to be monitored; and

(i) resolve or assist in resolving Incidents in accordance with SLRs and escalate to third parties and UNHCR as required.

3.7. Systems and Storage Event Management

Systems Event Management means those functions associated with managing systems events through their life cycle, including detecting events, analyzing them, and determining the appropriate action. Systems event management services include monitoring and logging the health and performance of data center servers and storage components across the UNHCR enterprise.

Contractor shall:

(a) work collaboratively with UNHCR to design and implement a comprehensive set of automated alerts and alert thresholds that span the enterprise;

(b) integrate monitoring solutions into event management tools and processes;

(c) review thresholds and provide feedback on areas of concern;

(d) create automated Incident tickets for events that exceed acceptable thresholds;

(e) collect, correlate, and analyze event data and make recommendations for service improvements; and

(f) provide read access to event monitoring and correlation reporting tools.

3.8. Systems Hardware Management and Support

System Hardware Management and Support are those activities associated with continually maintaining reliable and secure physical assets across all in-scope platforms.

Contractor shall:

(a) Provide or coordinate Remote Hands touch labour for the UNHCR corporate data center, including activities such as securing cabling, checking port numbers, observing or reporting indicators on equipment, basic observation of environment, and server re-boots;

(b) provide or coordinate Smart Hands for the UNHCR corporate Data Center, to include more complex tasks than Remote Hands such as management of colocation equipment, media and supply management, complex cable configurations, equipment testing and troubleshooting, circuit testing, and rack and stack;

(c) perform annual physical inventory;

(d) provide support and administration services for all server hardware including but not limited to:

(i) patches for server hardware firmware and basic input/output system (BIOS); and

(ii) updates to server hardware firmware and BIOS.

(e) be responsible for all upgrades to server and storage hardware (e.g. memory, disk, adapters);

(f) provide hardware support, including configurations for equipment, in the data center;

(g) manage and liaise with third party suppliers of server hardware, inclusive of coordination and resolution of manufacturer hardware warranty break-fix events;

(h) produce and maintain a capacity plan covering all systems and proactively inform UNHCR of the need for any changes;

(i) perform a periodic health check on all hardware; and

(j) maintain a list of all Users with system level privileges for remote console access (e.g. HP ILO).

3.9. System Software Management and Support

System Software Management and Support are those activities associated with continually maintaining reliable, available, and secure physical and virtual servers across all in-scope operating platforms, including Windows Server, Linux, and related middleware requiring privileged OS access to manage.

Contractor shall:

(a) Provide support and administration services for all operating systems including installation, maintenance, and monitoring of the products;

(b) perform routine upgrades to operating systems (OS) and related middleware on agreed schedules and during agreed maintenance times;

(c) perform proactive maintenance of server OS and related middleware to minimize impact of any potential shortcomings during agreed maintenance times;

(d) identify OS and related middleware patches, fixes, updates, and service packs for deployment and present for UNHCR consideration and approval;

(e) ensure that appropriate approval is obtained from UNHCR prior to application of any vendor patches and/or upgrades;

(f) perform monthly patching of production and non-production servers on the agreed schedule;

(g) provide monthly reports on patching of servers to include: patches and fixes deployed and metrics of success and failure of deployment;

(h) manage and liaise with Third Party suppliers for provision of OS software;

(i) deploy, configure and secure OS and related middleware in use by UNHCR to vendor recommended best practice or other agreed standards;

(j) ensure that any software security related patches for OS, related middleware, or other ancillary software is deployed in an agreed timely manner;

(k) implement monitoring of all OS and related middleware;

(l) maintain a list of all Users with system level privileges for all Operating System or related middleware access;

(m) ensure all certificates are renewed and installed;

(n) perform all system changes in accordance with the agreed UNHCR Change Control Procedure;

(o) ensure that all system administration functions are periodically performed including:

(i) system / file cleanup; and

(ii) server reboot as needed during agreed outage windows.

(p) Contractor shall also:

(i) maintain OS level firewall rules and policies;

(ii) perform periodic vulnerability scanning, intrusion detection testing, and remediation; and

(iii) monitor supplier websites for critical security guidelines, alerts and patches.

3.10. Storage Management and Capacity Planning

Storage Management and Capacity Planning are those activities associated with continually maintaining reliable, available, accessible, and secure storage devices across all in-scope platforms.

Contractor shall provide managed storage area network (SAN) and related storage services to include:

(a) Provide input into UNHCR storage requirements (e.g., performance, level of data segregation, tiered storage, data protection methods, reliability, encryption, security, scheduling, access control);

(b) document and maintain procedures to meet UNHCR and requirements and SLRs;

(c) create, configure, and assign storage space to servers and services;

(d) ensure provision of storage SAN and LAN connectivity including the installation of host bus adapter (HBA), switches, and fibre connections;

(e) replicate, where directed, SAN storage logical unit numbers to remote locations;

(f) reallocate storage;

(g) ensure storage capacity monitoring including alerting when utilization exceeds prescribed levels; and

(h) manage and liaise with third party suppliers of storage hardware, inclusive of coordination and resolution of manufacturer hardware warranty break-fix events.

3.11. Backup and Recovery Services

Managed Backup and Recovery (BAR) Services are those activities associated with the protection, restoration, and continuity of UNHCR systems and data.

Contractor shall provide managed Backup and Recovery (BAR) services to include:

(a) Provide input into backup and recovery requirements (e.g., performance, backup, recovery, archival, data retention, reliability, encryption, security, scheduling, access control);

(b) operate a data backup and recovery service for the Data Centres in accordance with the UNHCR approved backup and recovery policy, data retention policy, and the Service Levels;

(c) align the backup and recovery services with UNHCR Disaster Recovery and Business Continuity Policy including agreeing and maintaining the backup policy and procedures in line with UNHCR standards and Service Levels;

(d) back-up the systems according to the mutually agreed backup schedule. Once the back-up schedule has been authorized by UNHCR, Contractor shall set up, schedule, and carry out relevant back-ups of all User and system data that is held on the servers according to agreed backup schedules with UNHCR;

(e) in the event of a backup failure, load and unload back-up media at the Data Centres and in the backup storage devices in accordance with the backup policy and procedure;

(f) recover lost or damaged files, data, and systems as required from backup media, or as requested by UNHCR;

(g) carry out replacements of backup media in line with the manufacturers' guidelines and/or diagnostic information produced as a result of backup and recovery processes;

(h) recycle media at end of agreed retention period and replace where operationally desirable (e.g. wear and tear) according to policy agreed with UNHCR;

(i) manage off-site storage process, services, and/or provider (e.g. Iron Mountain);

(j) ensure that data recovery is tested on a regular basis to verify integrity of backups and back-up media according to an agreed schedule with UNHCR; in the event of test failures, Contractor shall notify UNHCR and prescribe a mitigation plan, then retest until success;

(k) ensure ongoing capability to recover archived data from media;

(l) document, maintain, and test end-to-end system recovery processes; and

(m) coordinate with UNHCR-designated Third-Party vendors to archive data media at approved secure offsite storage locations.

3.12. Platform Reporting

Reporting services are those activities that provide information to both UNHCR and Contractor to allow for the effective performance measurement and governance of the Data Centre and associated managed services.

Contractor shall:

(a) provide regular performance monitoring reports as outlined in Schedule 10 Appendix B (Reports) detailing all relevant system metrics server as agreed with UNHCR and in accordance with Schedule 14 (Contract Governance), including:

(i) Server performance by system, virtual machine and hypervisor host, covering CPU, Memory, I/O and other key server metrics

(ii) Storage performance by system, LUN, virtual disk, volume and storage aggregate, covering capacity, usage and I/O metrics such as latency, reads, and writes;

(iii) Backup performance by job, source system, and target media, each covering volume, usage, capacity, duration and I/O metrics; and

(iv) Event, Incident and Problem handling by system, server, storage and backup, covering relevant resolution and handling metrics.

(b) provide input into the capacity planning exercise to ensure that the Data Centre is sized at the level required for the Services to be provided; and

(c) on request by UNHCR, produce ad-hoc reports related to server and Data Centre service management aspects.

3.13. Server and Storage Documentation

Server and storage documentation services are those activities associated with continually developing, revising, maintaining, reproducing, and making server infrastructure information securely accessible on an as-needed basis.

Contractor shall:

(a) Recommend standard server documentation types and content;

(b) develop and maintain server documentation that meets UNHCR requirements;

(c) provide documentation to UNHCR in electronic format; and

(d) store and maintain all documentation in a designated repository. Some of the document types specific to this Schedule 2 include:

(i) server specifications;

(ii) storage specifications; and

(iii) as-built documentation for all physical and virtual devices that are deployed in development, test, QA, production and other technical environments.

4 Network Management Services

4.1. Network Support and Maintenance

Network support and maintenance are the activities associated with the provisioning and day-to-day management of the data network environment.

Contractor shall:

(a) Perform the on-going support and delivery of all local networks, and ensure end-User and server connectivity in order to achieve the Service Levels specified for all Services;

(b) perform maintenance on all local network infrastructure components in line with the equipment manufacturers' and/or UNHCR guidelines and ensure that firmware and operating system are kept current and security patches are applied. For these purposes, network equipment components include:

(i) routers, firewall and load balancers, switches, hubs, modems, and patch panels; and

(ii) other LAN components comprised of the traffic prioritization, network client services, network monitoring servers, software and scripts, networking protocols, address management, and name resolution services.

(c) administer the cable and patch panel management and perform patching to resolve problems or reconfigure the LAN;

(d) ensure that any maintenance action leading to a scheduled outage or a noticeable degradation of service is planned via the agreed Change Control Procedure in order to minimize disruption to the service;

(e) recommend standard Network Operations and Administration Services procedures;

(f) develop Network Operations and Administration Services Policies that meet UNHCR requirements and adhere to UNHCR policies;

(g) maintain the a Network Operations and Administration Services procedures manual that meets UNHCR requirements and adheres to UNHCR policies and standards;

(h) perform day-to-day Network Operations and Administration Services activities for in scope equipment including any break-fix activities;

(i) manage network Assets in accordance with UNHCR policies, standards, and procedures (including security oversight and Change Management policies and procedures);

(j) manage and provide proactive and reactive maintenance on network Assets;

(k) manage and respond to Services Requests and provide IMACs for network components (LAN, WAN, Wireless LAN) and sites;

(l) maintain and provide security information in a UNHCR-approved format, including access, general logs, and application logs in accordance with UNHCR security policies and procedures;

(m) coordinate network administration activities through defined Change Management processes;

(n) until such time as this is transitioned to the Service Desk, support provisioning and de-provisioning privileged account activities (e.g., administrative accounts) and maintain associated history logs as required; and

(o) support activities related to UNHCR- or Third Party-planned and unplanned outages (e.g., post-power outage startup activities, UNHCR preparedness emergency exercises or Incidents, and recovery).

4.2. Wireless Networks

Contractor shall:

(a) Manage and support a wireless LAN for visitors and UNHCR staff at all UNHCR Sites where the Services are being provided including but not limited to the HQ locations.

4.3. LAN Administration

Contractor shall:

(a) Create and maintain Internet Protocol (IP) version 4 and 6 address spaces following the policies and standards set by UNHCR;

(b) allocate internal and external (public) IP addresses when necessary and maintain the register of used and available IP addresses at UNHCR;

(c) maintain and administer internal and external (public) Domain Name Service (DNS);

(d) maintain and administer internal Dynamic Host Communications Protocol (DHCP); and

(e) implement access and authentication controls relating to the management and configuration of all intelligent components of the network.

4.4. Network Security

Contractor shall:

(a) Co-operate with the relevant parties to ensure that appropriate security is put in place with a view to protecting the network and its components from malicious attack and unauthorized access wherever the UNHCR network connects to other networks;

(b) manage and maintain components and configurations for firewalls, reverse proxies, routers, and IDS/IPS in support of the above;

(c) use its reasonable best efforts to ensure that Users on the UNHCR network are prevented from making malicious attacks on other networks;

(d) perform periodic vulnerability scanning, intrusion detection testing and remediation; and

(e) monitor supplier websites for critical security guidelines, alerts and patches and the implementation of such recommendations.

4.5. Network Monitoring

Contractor shall provide Network Monitoring activities associated with the proactive monitoring and alerting of network performance and management information, as well as the full management and administration of the monitoring tools.

Contractor shall:

(a) Recommend Contractor's standard Network Monitoring Services and Incident and Problem Resolution procedures;

(b) develop Network Monitoring Services policies that meet UNHCR requirements and adhere to UNHCR policies;

(c) develop, document, and maintain a Network Monitoring Services procedures manual and submit for approval, procedures that meet UNHCR requirements and adhere to UNHCR policies and standards;

(d) manage current or provide and manage automated tools for monitoring voice circuits, devices and traffic from Contractor's Network Operations Center (NOC);

(e) implement measures and provide proactive analysis of network data and reports to limit network Outages and optimize UNHCR's bandwidth utilization;

(f) proactively monitor current network utilization and provide information to UNHCR for use in determining future capacity requirements by using UNHCR provided tools;

(g) monitor, operate, perform Problem determination, alert, and repair for in-scope network environments on a 24x7 basis, including for Service Outage, loss of connection and specific performance indices by using UNHCR provided tools;

(h) monitor LAN ports for all servers and uplinks; LAN ports should be monitored for peak utilization, average utilization, latency, and error levels unless otherwise agreed upon

by UNHCR by using UNHCR tools. Contractor should also have the capability to turn on monitoring for individual regular desktop ports for troubleshooting;

(i) perform remote LAN analysis diagnostics and on-site troubleshooting;

(j) manage Service Requests and dispatch process as directed by UNHCR;

(k) dispatch pre-approved Contractor on-site support personnel and/or Third Parties as appropriate;

(l) manage data network performance or availability issues resulting from a fault or impairment in network devices or voice circuits;

(m) provide reporting (e.g. availability, utilization, latency, capacity) on network components providing connectivity to UNHCR Applications; and

(n) collect data and reports from third parties and provide consolidated reporting (e.g. availability, utilization, latency, capacity) on out-of-scope network components (e.g. Third party WAN/ LAN network circuits and components, third party partner and service provider connections) providing connectivity to UNHCR applications.

4.6. Network Event Management

Network Event Management means those functions associated with managing network events through their life cycle, including detecting events, analyzing them, and determining the appropriate action. Network event management services include monitoring and logging the health and performance of the network and network components across the UNHCR enterprise.

Contractor shall:

(a) Work collaboratively with UNHCR to design and implement a comprehensive set of automated alerts and alert thresholds that span the enterprise;

(b) integrate monitoring solutions into event management tools and processes;

(c) review thresholds and provide feedback on areas of concern;

(d) create automated Incident tickets for events that exceed acceptable thresholds;

(e) collect, correlate, and analyze event data and make recommendations for service improvements; and

(f) provide read access to event monitoring and correlation reporting tools.

4.7. Network Reporting

Contractor shall:

(a) Provide regular performance monitoring reports Schedule 10 Appendix B (Reports) on LAN uptime, incidents, and other performance metrics; and

(b) provide input into the capacity planning exercise to ensure that the networks are sized at the level required for the Services to be provided.

4.8. Network Documentation

Network Documentation Services are those activities associated with continually developing, revising, maintaining, reproducing, and making secure network infrastructure information securely accessible on an as-needed basis.

Contractor shall:

(a) Recommend standard network documentation types and content;

(b) develop and maintain network documentation that meets UNHCR requirements;

(c) provide documentation to UNHCR in electronic format; and

(d) store and maintain all documentation in a designated repository. Some of the document types specific to this Schedule 2 include:

(i) Network system specifications and topologies; and

(ii) as-built documentation for all network devices that are deployed in development, test, QA, production and other technical environments.

5 *Implementation of New Services*

5.1. Equipment Installation / De-installation

Contractor shall:

(a) Support actively the development of new Data Centre and Network Management services. Such new services shall be added to the Services in accordance with the Change Control Procedure set forth in the agreed Change Control Procedure.

(b) be responsible for the complete set of associated works in line with Applicable Law including health and safety requirements, and shall liaise with appropriate teams within UNHCR to this effect where installation / de-installation has been required and confirmed by UNHCR;

(c) manage the installation / de-installation and testing as needed of all LAN changes in accordance with the procedures provided by Contractor and approved by UNHCR, updating of the relevant documentation to reflect the changes, and informing UNHCR's Global Service Desk of the impact of the change:

(i) For the avoidance of doubt, where works may be carried out by the Contractor Approved Subcontractors, the end-delivery of the project remains the responsibility of Contractor. Contractor shall be responsible for the resolution of faults during installation and commissioning, and provide all necessary warranty and documentation; and

(ii) where works may be carried out by Third Parties appointed by UNHCR, Contractor shall have the responsibility to provide an efficient service interface for the successful end delivery of the works. Contractor shall remain responsible for the Service Support functions post-installation and the Service Management aspects, e.g. Configuration and Capacity Management.

(d) an installation/de-installation comprises any of the following elements:

(i) Provide planning and coordination for the installation of new equipment and deinstallation of old equipment;

(ii) installation/de-installation of structured cabling system, floor outlets, and data points;

(iii) installation/de-installation of equipment cabinets and active equipment in computer rooms and in the network;

(iv) installation/de-installation of drop leads, patch cords, fibre patch cords for the connection of PCs, printers, and server equipment and any other network peripheral connected to the structured cabling system; and

(v) installation/de-installation of Network Interface Cards (NICs) and modems to networked equipment (physical and logical connection).

(a) all LAN (including both fixed wired and wireless networks) design, installation and testing works supplied by Contractor shall comply with Applicable Law and international standards (IEEE and ISO) including prevalent standards specified UNHCR:

(i) ISO 8802.3 1000 Mbps Gigabit Ethernet;

(ii) ISO 8802.3 100BASET operating at 100Mb/s;

(iii) ISO 8802.3 10BaseT operating at 10Mb/s;

(iv) structured cabling utilizing TIA/EIA-568-B or Category 6 e standards; and

(v) fibre connectivity including single mode and multimode including FC and SC termination.

5.2. Projects

(a) Follow the agreed ICT Project and Governance process as specified in Schedule 13 (Project and Additional Services) and Schedule 14 (Contract Governance) in the delivery of new services. Contractor shall be involved in all aspects of the service development and will provide work and cost estimates as part of the approval process.

6 *Maintenance Windows*

Contractor shall:

(a) Perform Data Centre maintenance (hardware and software) at lower usage periods (e.g. nights or weekends) whenever possible and in mutual agreement with UNHCR, in order to minimize the impact on operations. All Data Centre and Network Management maintenance services shall be part of the base service fees and UNHCR shall not incur any additional costs (e.g. overtime) for the performance of the Services during lower usage periods; and

(b) Ensure that all Changes to the systems (hardware and software) should be based on an approved Change (or emergency Change). Contractor is expected to follow the established UNHCR Change Advisory Board (CAB) and ITIL procedures when implementing a Change through the Change Control Procedure.

7 Out of Scope Services

The Parties agree that the following services are not within the scope of the Services, unless otherwise provided in a Statement of Work or other contract modification:

(a) Data Centre facilities;

(b) application support;

(c) equipment procurement;

(d) licenses and license management;

(e) WAN transport layer ownership;

(f) large scale upgrade / roll-out.